ORDER NO. HAD84072861A4

Service Manual

Computer Drive New Class A Stereo Integrated Amplifier

SU-V8X

Colors

(K)···· Black Type
(S)···· Silver Type

Color	Area
(S)(K)	[PC]····· European Audio Club

Please use this manual together with the service manual for Model No. SU–V8X, Order No. HAD84042754C9.

When servicing model SU–V8X[PC], please refer to the service manual for model No. SU–V8X[XA].

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan
Printed in Japan
8407 0500 (K) SH

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Computer Drive New Class A
Stereo Integrated Amplifier

Amplifier
SU-V8X

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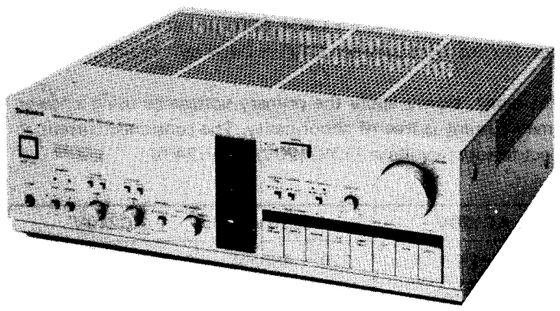

Color	Area
(K)(S)	[D] ·····Scandinavia
(K)(S)	[EF]·····France
(K)(S)	[Ei]·····Itary
(K)(S)	[EW]·····Switzerland
(K)(S)	[EK]·····United Kingdom
(K)(S)	[EH]·····Holland
(K)(S)	[EGA]·····F. R. Germany
(S)	[EB]·····Belgium
(K)(S)	[XA]·····Southeast, Asia, Oceania, Africa, Middle Near East and Central South America
(K)(S)	[XL]·····Australia
(S)	[PA]·····Far East PX
(S)	[PE]·····European Military

SPECIFICATION

(DIN 45 500)

■ AMPLIFIER SECTION

20 Hz~20 kHz continuous power output
both channels driven — 2 × 120W (4Ω)
2 × 120W (8Ω)

40 Hz~16 kHz continuous power output
both channels driven — 2 × 120W (4Ω)
2 × 120W (8Ω)

1 kHz continuous power output
both channels driven — 2 × 120W (4Ω)
2 × 120W (8Ω)

Total harmonic distortion
rated power at 20 Hz~20 kHz — 0.007% (4Ω)
0.003% (8Ω)
rated power at 40 Hz~16 kHz — 0.007% (4Ω)
0.003% (8Ω)
rated power at 1 kHz — 0.0015% (4Ω)
0.001% (8Ω)
half power at 20 Hz~20 kHz — 0.002% (8Ω)
half power at 1 kHz — 0.001% (8Ω)
−26 dB power at 1 kHz — 0.01% (4Ω)
50 mW power at 1 kHz — 0.01% (4Ω)

Intermodulation distortion
rated power at 250 Hz: 8 kHz=4:1, 4Ω — 0.01%
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω — 0.007%

Power bandwidth
both channels driven, −3 dB — 5 Hz~70 kHz (4Ω, 0.03%)
5 Hz~70 kHz (8Ω, 0.02%)

Residual hum and noise — 0.5 mV

Damping factor — 50 (4Ω), 100 (8Ω)

Input sensitivity and impedance
PHONO MM — 2.5 mV/47kΩ
MC — 170 μV/220Ω
TUNER, CD, TV/AUX 1, VIDEO/AUX 2 — 150 mV/18kΩ
TAPE 1/DA TAPE, TAPE 2 — 150 mV/18kΩ

PHONO maximum input voltage (1 kHz, RMS)
MM — 210 mV
MC — 15 mV

S/N
rated power (4Ω)
PHONO MM — 78 dB (IHF, A: 88 dB, input 2.5 mV)
MC — 72 dB (IHF, A: 72 dB, input 250 μV)
TUNER, CD, TV/AUX 1, VIDEO/AUX 2, TAPE 1/DA TAPE, TAPE 2 — 93 dB (IHF, A: 104 dB)
−26 dB power (4Ω)
PHONO MM — 72 dB
MC — 68 dB
TUNER, CD, TV/AUX 1, VIDEO/AUX 2, TAPE 1/DA TAPE, TAPE 2 — 74 dB
50 mW power (4Ω)
PHONO MM — 68 dB
MC — 67 dB
TUNER, CD, TV/AUX 1, VIDEO/AUX 2, TAPE 1/DA TAPE, TAPE 2 — 69 dB

Frequency response
PHONO — RIAA standard curve ±0.5 dB (30 Hz~15 kHz)
TUNER, CD, TV/AUX 1, VIDEO/AUX 2, TAPE 1/DA TAPE, TAPE 2 — 0.7 Hz~140 kHz (−3 dB) +0, −0.2 dB (20 Hz~20 kHz)

Tone controls
BASS — 50 Hz, +10 dB~ −10 dB
TREBLE — 20 kHz, +10 dB~ −10 dB

Subsonic filter — 30 Hz, −6 dB/oct.

Loudness control (volume at −30 dB) — 50 Hz, +9 dB

Output voltage and impedance
REC OUT — 150 mV

Channel balance, CD, AUX 1, 2 250 Hz~6,300 Hz — ±1 dB

Channel separation, CD, AUX 1, 2 1 kHz — 55 dB

Headphones output level and impedance — 740 mV/330Ω

Load impedance
MAIN or REMOTE — 4Ω~16Ω
MAIN and REMOTE — 8Ω~16Ω

■ GENERAL

Power consumption — 670W
Power supply — AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W×H×D) — 430 × 142 × 380 mm (16-15/16" × 5-9/16" × 14-15/16")
Weight — 13.1 kg (28.8 lb.)

Note:
Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

(Specifications are subject to change without notice for further improvement.)

Technics

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Matsushita Electric Industrial Co., Ltd.
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SU-V8X

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■ FEATURES

- Computer drive, improved version of New Class A.
- Large output amplifier of 120W + 120W, coping with digital source in wide dynamic range.
- Power linear circuit that eliminates distortion due to speaker impedance change.
- Low noise, high gain ICL equalizer circuit that makes direct connection of MC cartridge possible.
- Electronic protector based on microcomputer, which protects the speaker and amplifier.
- High S/N, low distortion NF–CR type tone control.
- Two tape jacks, 2 Aux jacks, and CD jack to cope with the new media age.
- Exclusive jack for external equipment, which is very convenient when using a graphic equalizer.

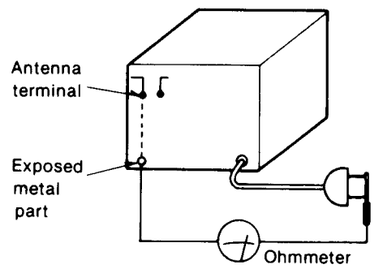
■ SAFETY PRECAUTION

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

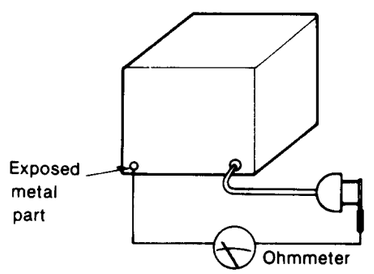
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ

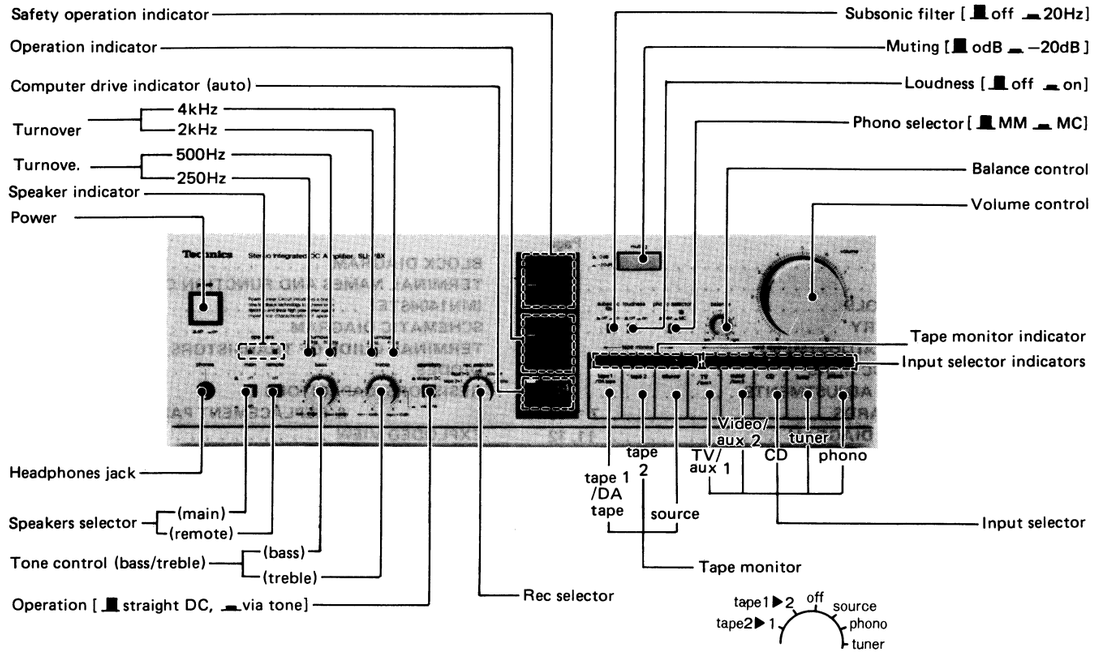


(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ LOCATION OF CONTROLS



*** [EGA] areas are provided without voltage selector.**
*** 240V (50/60Hz) for Australia and United Kingdom.**
*** 220V (50/60HZ) for Continental Europe.**
*** Phono input capacitance is about 150pF.**

■ PROTECTION CIRCUITRY

The protection circuitry may have operated if either of the following conditions is noticed:

- No sound is heard when the power is turned on.
- Sound stops during a performance.

The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker connection wires are "shorted" or if speaker systems with an impedance less than the indicated rated impedance of this unit are used.

If this occurs, follow the procedure outlines below:

1. Turn off the power.
2. Determine the cause of the problem and correct it.
3. Turn on the power once again after one minute.

Note

When the protection circuitry functions, the unit will not operate unless the power is first turned off and then on again.

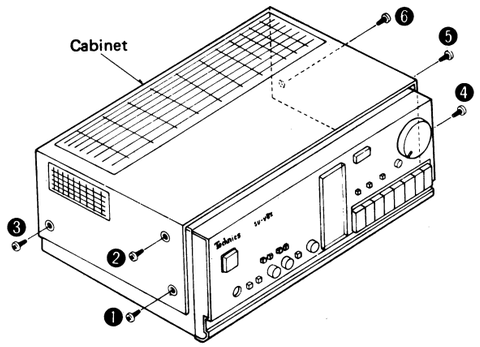
■ BEFORE REPAIR AND ADJUSTMENT

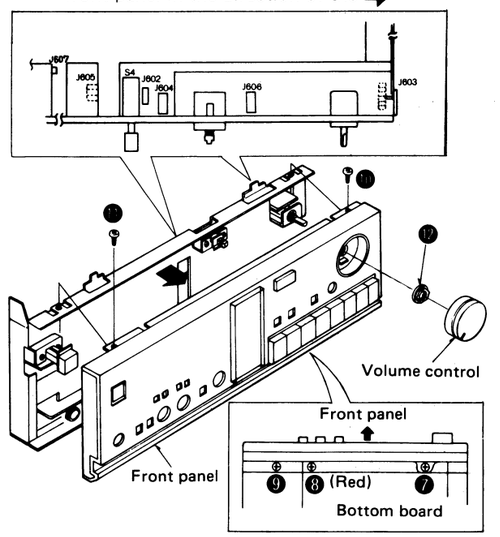
1. Turn off the power supply and short-circuit of power supply capacitors (C401 ~ C404, 8200 μF) at resistance (about 10Ω,5W) in order to discharge the charged voltage. Do not short between C401 ~ C404 by screwdriver. It may damage the component.
2. Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a power supply voltage controller to make sure that the consumed current is free of abnormality. The consumed current at 60Hz/50Hz in no signal mode is shown below with respect to supply voltage 110V/120V/220V/240V.

Power supply voltage		AC110V	AC120V	AC220V	AC240V
Cousumed current	50Hz	420 ~ 950mA	400 ~ 880mA	220 ~ 480mA	200 ~ 440mA
	60Hz	400 ~ 910mA	370 ~ 840mA	200 ~ 460mA	180 ~ 410mA

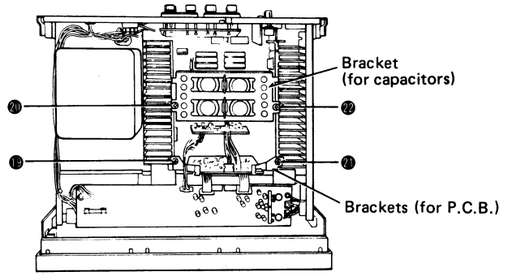
■ DISASSEMBLY INSTRUCTIONS

Ref. No. 1	How to remove the cabinet	Ref. No. 2	How to remove the front panel
Procedure 1	● Remove the 6 setscrews.	Procedure 1➡2	● Remove the 5 setscrews. ● Pull out the volume knob and remove the nut. ● Pull out the connector terminals (J602 ~ J606, J607) and remove the front panel in the direction of the ➡

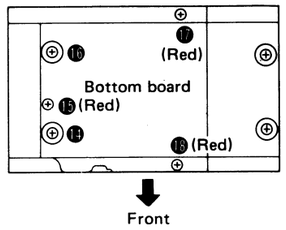




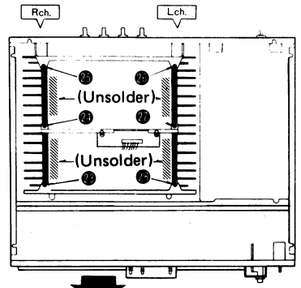
Ref. No. 3	How to remove the power transistors
Procedure 1➡3	● Remove the 4 setscrews and pull out the brackets.



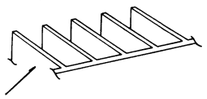
● Remove the 5 setscrews and pull out bottom board.

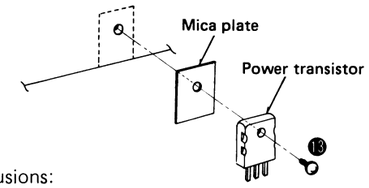


● Remove the 3 setscrews (LorR channel).
● Unsolder the power transistors (LorR channel) and pull out the heat sink.



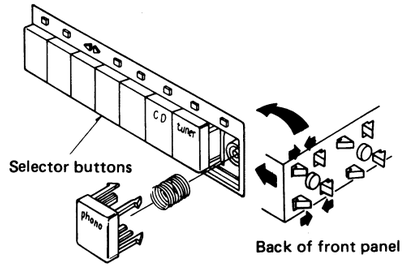
● Remove the 1 setscrew and pull out the power transistor.



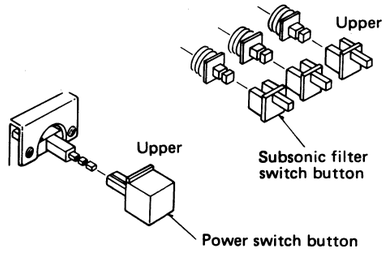


Causions:
When mounting the power transistor onto the heat-sink, especially keep the following points in mind.
1. Clean the area on the heat-sink side.
2. Be sure to use new mica plate.
3. Apply silicone compound (SZZOL15) to the both sides of mica plate.

Ref. No. 4	How to remove the selector buttons and push button
Procedure 1➡2➡4	● Remove the claw that fastens the selector button from the back of front panel, and push it forward.



● Fit the power switch button and subsonic filter switch button in the position as fig.



■ MEASUREMENTS AND ADJUSTMENTS

1. Idling (ICQ) Adjustment (after reparing the main amp.)

(1) After the repair, set the sound volume to maximal before tuning on the power switch, and connect nothing to the speaker terminals.
(2) Completely turn ICQ control (VR301, VR302) counter clockwise.
(3) Increase the voltage applied to the amplifier gradually from OV by means of a power supply voltage controller, and make sure of the value in the Figure on page 4 before starting the adjustment.
(4) Connect the DC electronic voltmeter to TP301 (+) and TP303 (–) (Lch) or TP302 (+) and TP304 (–) (Rch).
(5) Adjust VR301 (Lch) or VR302 (Rch) so that the voltage is 23mV about 15 ~ 20 min. after power switch "on".

In this set, ICQ is controlled by microcomputer, and ICQ a little more that the normal level is applied by "PREHEAT" for about 15 sec. after power ON.
After that, the output level and transistor temperature are detected by "AUTO", thereby automatically controlling ICQ.

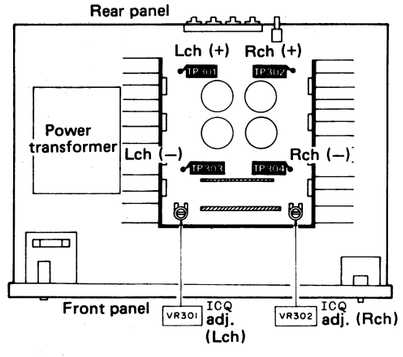
2. Check of DC Detection Circuit

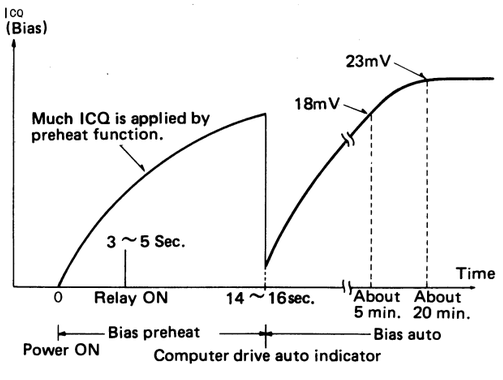
(1) Set the input selector to the "tuner" position.
(2) Apply DC voltage +1V (to Lch) to the playback terminal of tape 1, –1V (to Rch) to the playback terminal of tape2.
(3) Set the input selector to the "tape 1" position.
(4) Make sure
- – relay is off.
- – "auto" indicator "on" goes out.
- – "safety operation" indicator blinks.

3. Check of Overload Detection and Protection Circuit

(1) Connect the audio oscillator to the aux1 terminals and apply the input signal of 1kHz to the terminals.
Then adjust the output level of the audio oscillator so that the output level of the speaker terminals becomes 3V.
(2) Connect 0.33 Ω (5W) resistor to the remote speaker terminal.
(3) Make sure
- – relay is off.
- – "auto" indicator "on" goes out.
- – "safety operation" indicator blinks.

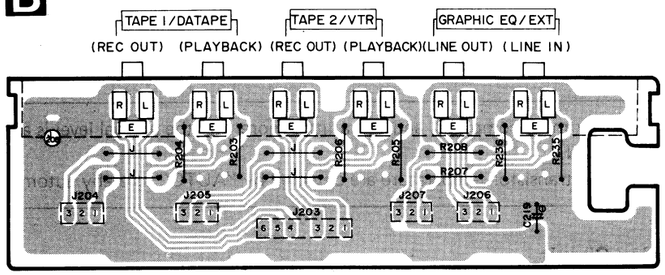
● Adjustments points



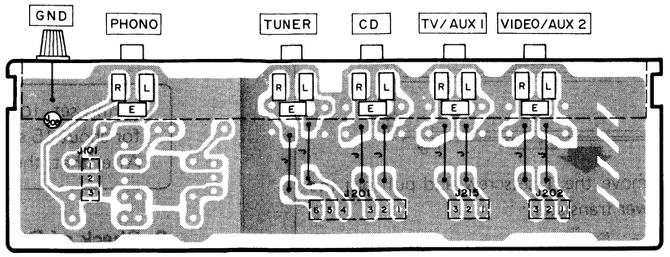


■ PRINTED CIRCUIT BOARDS

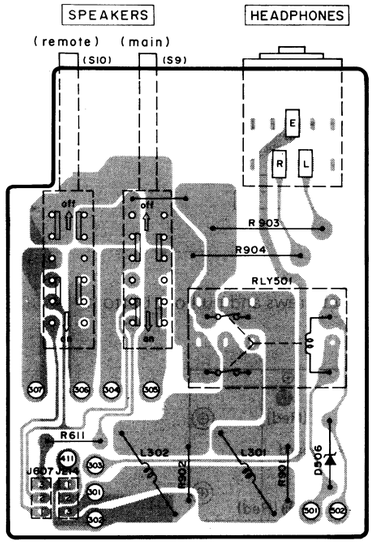
B In-Output circuit P.C.B.



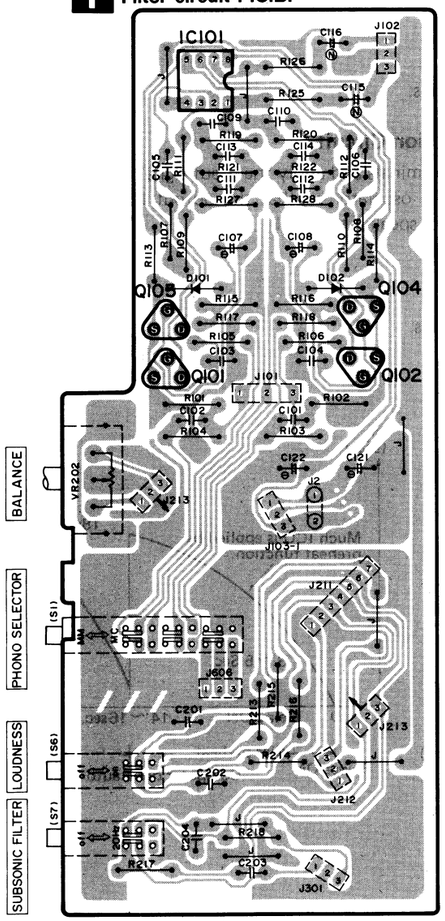
A Input circuit P.C.B.



P Headphones / Speaker selector circuit P.C.B.

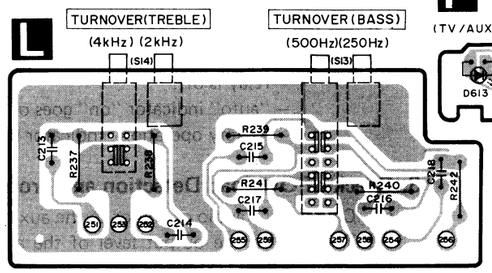


I Equalizer / Cartridge selector / Filter circuit P.C.B.



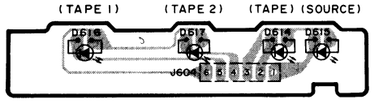
Turn over selector circuit P.C.B.

L

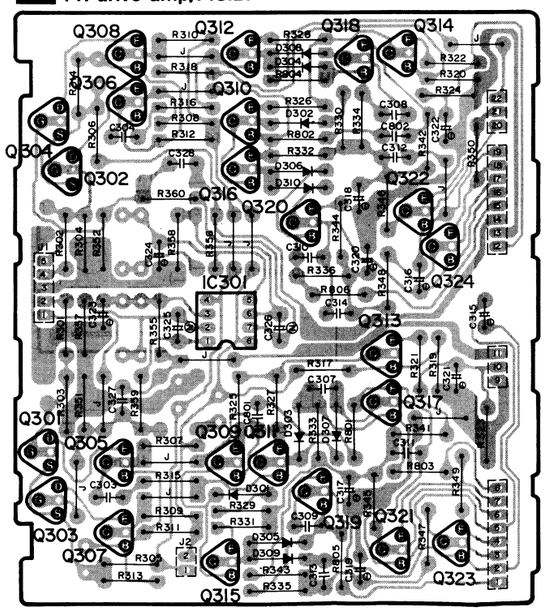


F

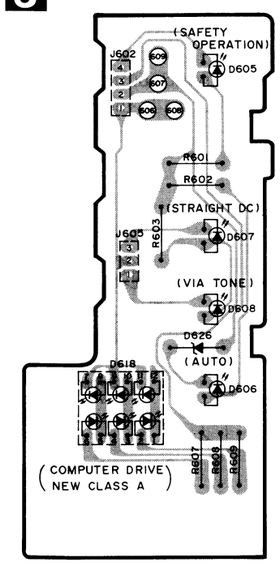
H



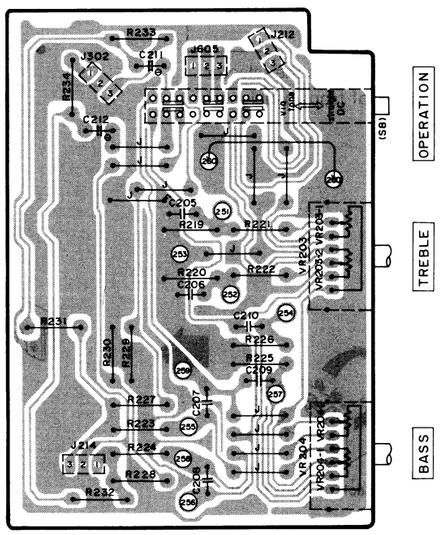
M Differential amp. / Cascade DC servo / Pri drive amp. P.C.B.



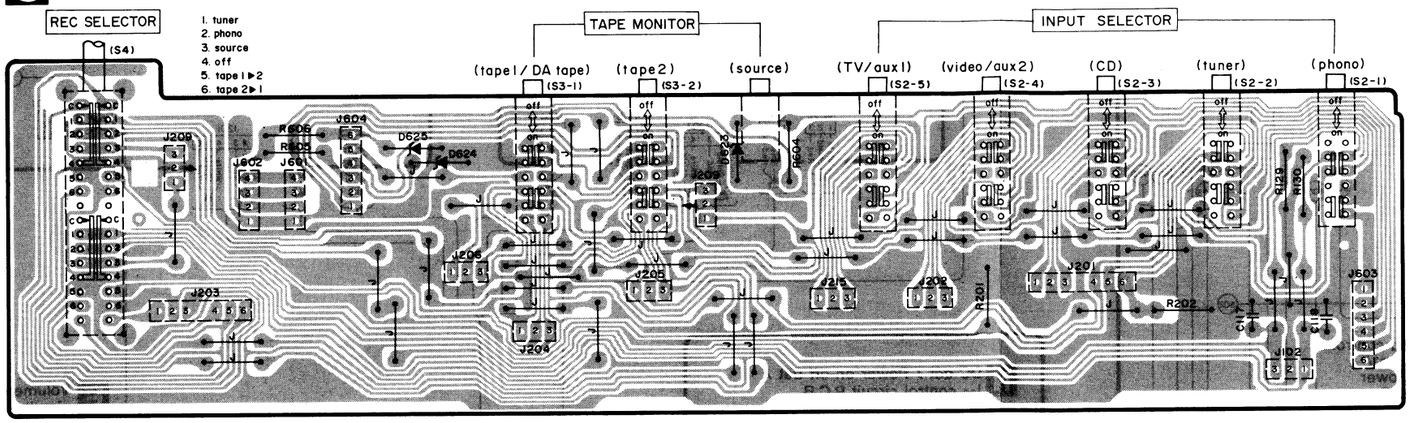
J



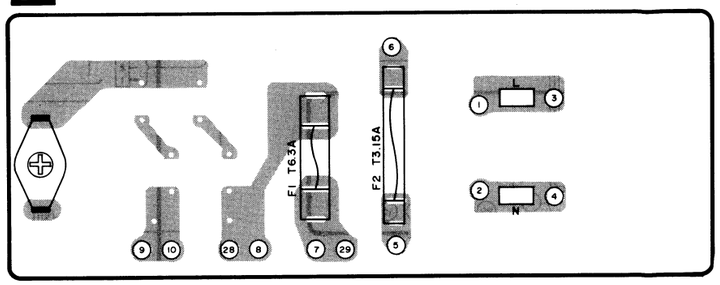
K Bass / Treble control circuit P.C.B.



C Input selector / Tape monitor selector P.C.B.

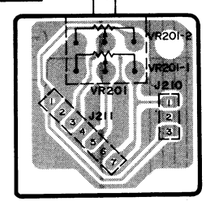


R

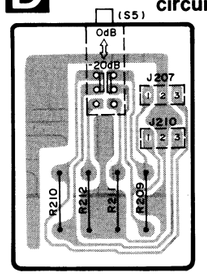


Volume control circuit P.C.B.

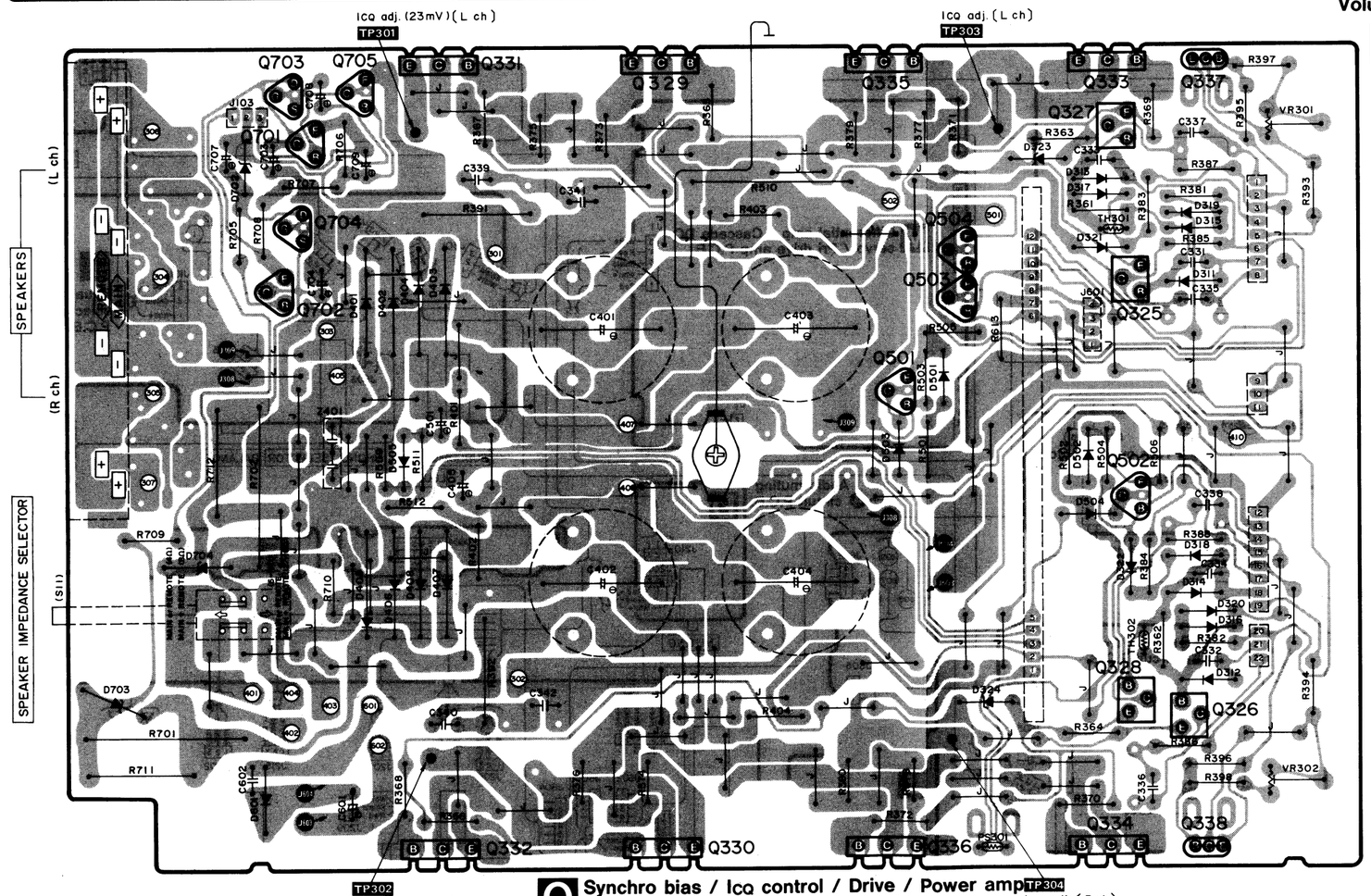
E



D

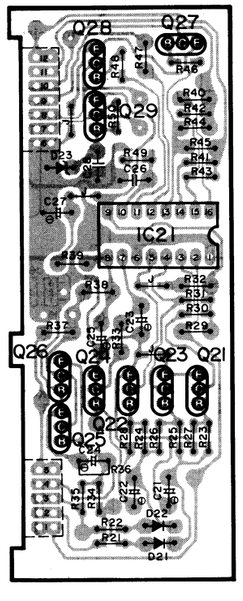


Audio muting circuit P.C.B.

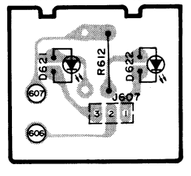


O Synchro bias / I_{CQ} control / Drive / Power amp Overload det./ Power supply circuit P.C.B.

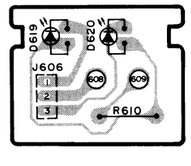
DC det / Power on-off N det / I_{CQ} control circuit P.C.B.



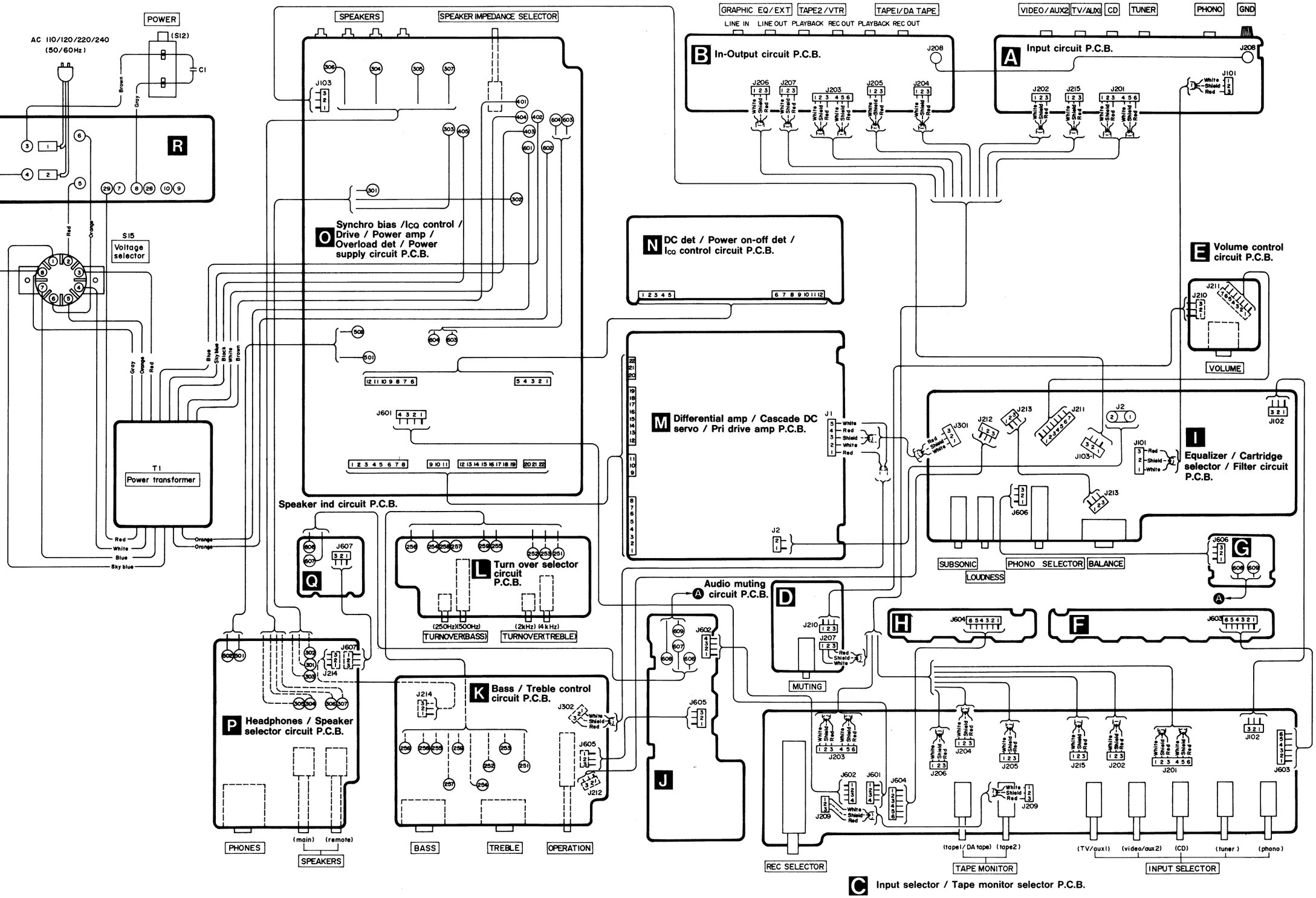
Q Speaker ind. circuit P.C.B.



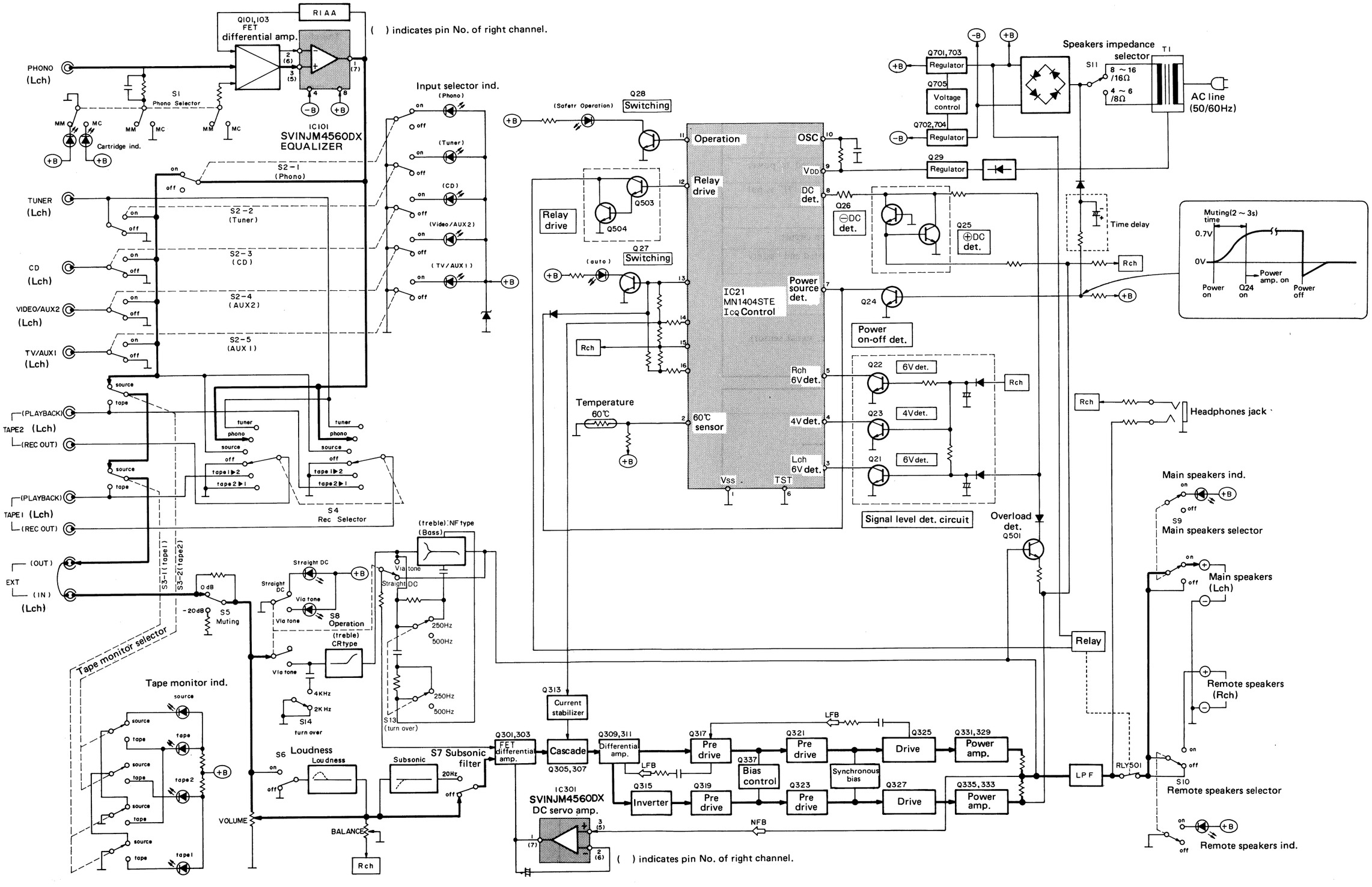
G



■ WIRING CONNECTION DIAGRAM



■ BLOCK DIAGRAM

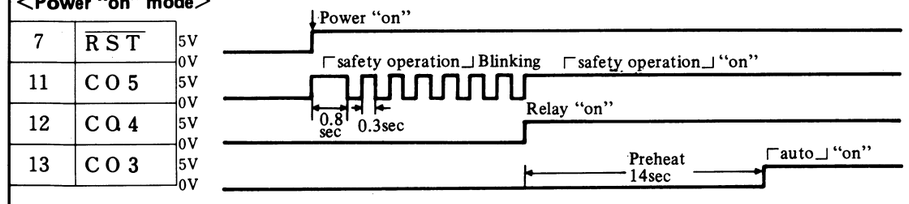


■ TERMINAL NAMES AND FUNCTION OF Icq CONTROL (MN1404STE)

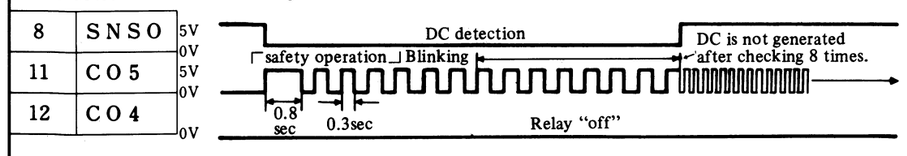
No.	Symbol	Name of block	Description of terminal
1	VSS	Power supply input terminal	Grounded. (0V)
2	A13	Input port A	Temperature detection circuit. When 60°C (140°F) sensor of power amplifier operates, "H" is put in causing the outputs of terminals 14 ~ 16 to go "H".
3	A12		When effective output 6V signal sensor of L-ch power amplifier operates, "L" is put in causing the output of terminal 14 to go "H".
4	A11		When effective output 4V signal sensors of both-ch power amplifiers operate, "L" is put in causing the output of terminal 15 to go "H".
5	A10		When effective output 6V signal sensor of R-ch power amplifier operates, "L" is put in causing the output of terminal 16 to go "H".
6	TST	Test input terminal	Terminal for testing LSI. (Ground)
7	$\overline{RST}$	Reset input terminal	All outputs are cleared or reset with input at "L". (It is connected to power supply circuit)
8	SNSO	Sensor input terminal	When overload detection circuit of power amplifier output operates, "H" is put in causing the output of terminal 12 to go "L".
9	VDD	Power supply input terminal	Apply 5V.
10	OSC	OSC input terminal	Clock signal (about 415kHz) can be obtained by internal oscillation circuit.
11	CO5	Output port C	When protection circuit operates, "H" and "L" outputs are repeated and "safety operation" indicator blinks.
12	CO4		Output relay and meter relay turn ON with "H" output.
13	CO3		Indicator "auto" lights up at "H".
14	CO2		Icq control signal is emitted from A input port (temp. sensor, signal sensor). ("H" output)
15	CO1		
16	CO0		

No.	Symbol	Time chart

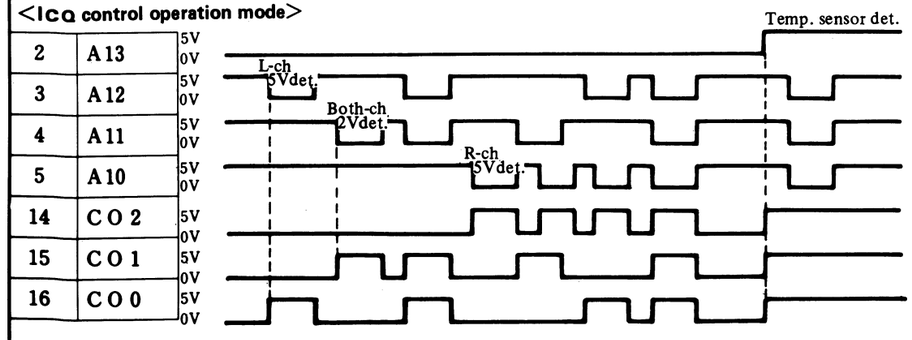
<Power "on" mode>



<DC detection or load shorting mode>



<Icq control operation mode>



■ SCHEMATIC DIAGRAM

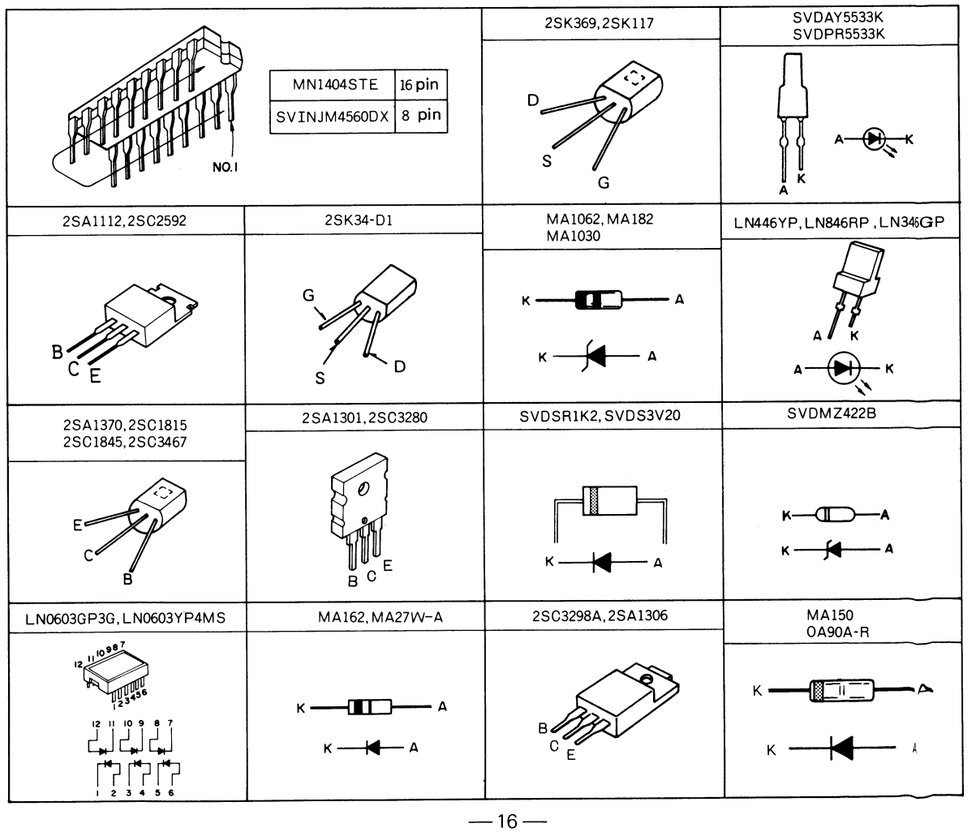
(This schematic diagram may be modified at any time with the development of new technology.)

* The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. with ★ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part please use the part No. in the replacement part list.

Note :

1. **S 1** : Phono selector (Cartridge) switch in **"MM"** position.
2. **S2–1 ~ S2–5** : Input selector switch in **"phono"** position.
   S2–1 : phono, S2–2 : tuner, S2–3 : CD, S2–4 : video/aux 2, S2–5 : TV/aux 1
3. **S3–1 ~ S3–2** : Tape input selector switch in **"off"** position.
   S3–1 : tape 1/Digital /audio tape
   S3–2 : tape 2
4. **S 4** : Rec selector switch in **"off"** position. (tape 2▶1 ⇔ tape 1▶2 ⇔ off ⇔ source ⇔ phono ⇔ tuner)
5. **S 5** : Muting switch in **"OdB"** position. (OdB ⇔ 20dB)
6. **S 6** : Loudness switch in **"off"** position.
7. **S 7** : Subsonic filter switch in **"off"** position. (off ⇔ 20Hz)
8. **S 8** : Operation switch in **"straight DC"** position. (straight DC ⇔ via tone)
9. **S 9** : Main speaker selector switch in **"on"** position.
10. **S10** : Remote speaker selector switch in **"off"** position.
11. **S11** : Impendance selector switch in **"4/8 Ω"** position. (4/8 Ω ⇔ 6 ~ 16/12 ~ 16 Ω)
12. **S12** : Power switch in **"on"** position.
13. **S13** : Turnover (low) selector switch in **"500Hz"** position.
14. **S14** : Turnover (High) selector switch in **"2kHz"** position.
15. **S15** : Voltage selector switch in **"220V"** position. (110V ⇔ 120V ⇔ 220V ⇔ 240V)
16. This is the basic circuit diagram (For continental Europe) of this unit.
    Note that part of the circuit is subject to change depending on the areas.
17. Regarding the circuits to be changed in the basic circuit diagram (For continental Europe) and related areas [XA], [PA], [PE] and [EGA] refer to the separate service manual (Order No. HAD84042754C9–A).

■ TERMINAL GUIDE OF TRANSISTORS, IC'S AND DIODE



A Input circuit

PHONO L R
GND
TUNER L R
CD L R
TV/AUX 1 L R
VIDEO/AUX 2 L R
REC OUT L R
TAPE1/DA TAPE
PLAYBACK L R
REC OUT L R
TAPE 2/VTR
PLAYBACK L R
LINE OUT L R
GRAPHIC EQ /EXT
LINE IN L R

B In — output circuit

C Input selector / Tape monitor selector

S2 (INPUT SELECTOR)
S2-1 (PHONO)
S2-2 (TUNER)
S2-3 (CD)
S2-4 (VIDEO/AUX2)
S2-5 (TV/AUX1)
S3 (TAPE MONITOR)
S3-2 (TAPE 2)
S3-1 (TAPE 1)
S4 (REC SELECTOR)
1. tuner
2. phono
3. source
4. off
5. tape 1 ▶ 2
6. tape 2 ▶ 1
Rec selector

D Audio muting circuit

S5 (MUTING) 0dB –20dB
Audio muting

E Volume control circuit

VR201-1 100KB VOLUME
VR201-2
volume control

F

D609～613 SVDPR5533K INPUT IND.
D609 PHONO
D610 TUNER
D611 CD
D612 VIDEO/AUX2
D613 TV/AUX1

G

D619 SVDPR5533K MM IND.
D620 SVDAY5533K-M MC IND.

H

D615 SVDPR5533K INPUT IND
D614,616,617 SVDAY5533K-M TAPE IND
D615 (SORUCE)
D614 (TAPE)
D617 (TAPE 2)
D616 (TAPE 1)

D623,625 MAI030L 3V ZENER
D624 MAI030 3V ZENER

I Equalizer / Cartridge selector / Filter circuit

S1 (PHONO SELECTOR)
MM-MC selector
Q101～104 2SK369 FET EQUALIZER
D101, 102 MA150
IC101 SVINJM4560DX EQUALIZER
S6 (LOUDNESS)
Balance
Loudness
S7 (SUBSONIC) 20Hz
Subsonic

J

D605,608 LN446YP INDICATOR
D607 LN846RP DC IND.
D606 LN346GP AUTO IND.
D626 MAI030 3V ZENER
D618 LN0603YP4MS COMPUTER DRIVE NEW CLASS A IND.

K Bass / Treble control circuit

S8 (OPERATION)
Operation
Bass
Treble

L Turn over selector circuit

S13 (TURNOVER) BASS
S14 (TURNOVER) TREBLE

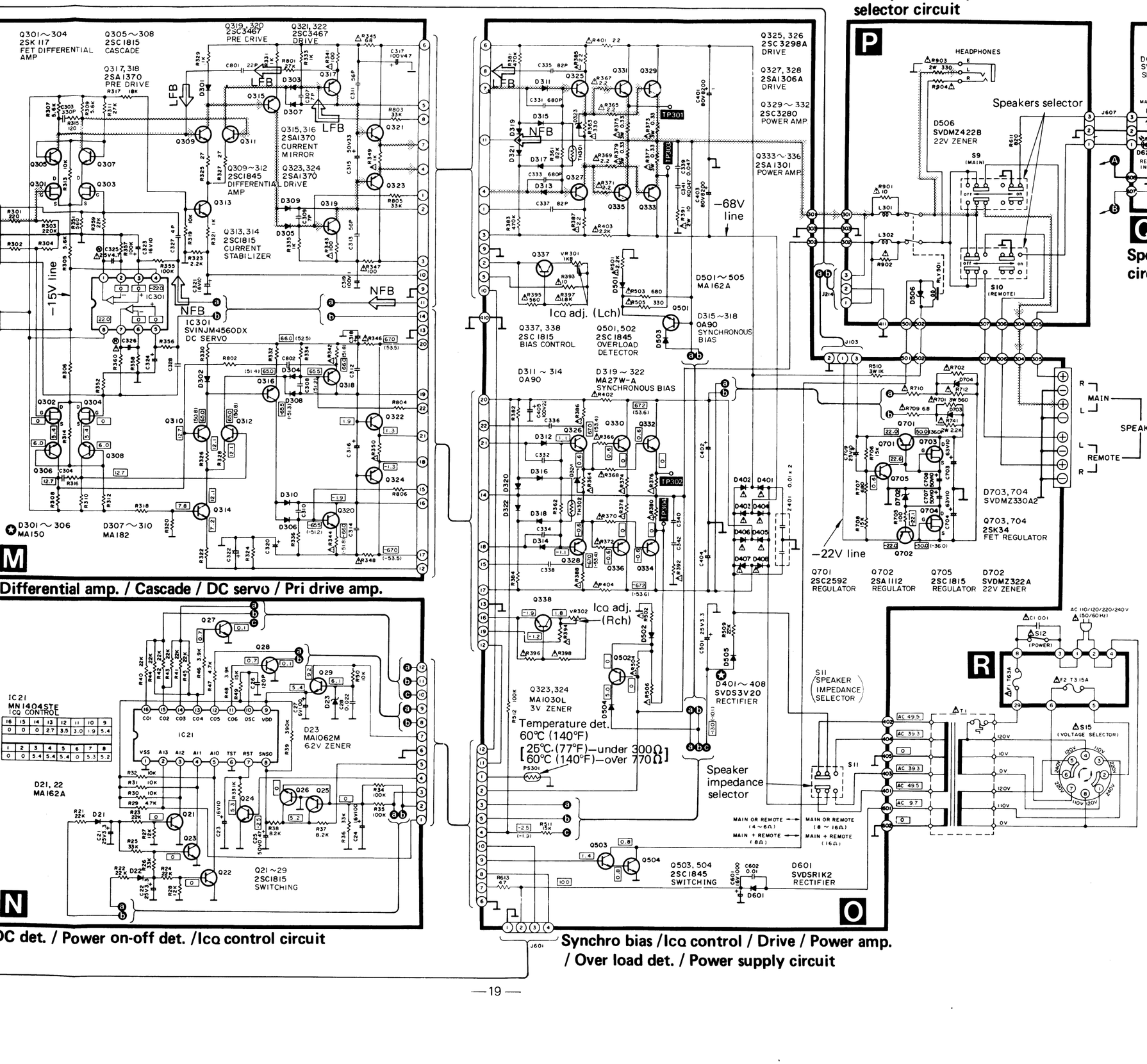
M Differential amp. / C

Q301～304 2SK117 FET DIFFERENTIAL AMP
Q305～30 2SC1815 CASCADE
Q317,318 2SA1370 PRE DRIVE
D301～306 MA150
D307～31 MA182

N DC det. / Power on-of

IC21 MN1404STE EQ CONTROL
D21, 22 MA162A

−22V line
−15V line



18. Important safety notice :
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
19. ▭ Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
20. ⋙ Phono signal (Lch)
21. ——— Positive voltage lines or Nagative voltage lines.

■ RESISTORS, CAPACITORS & REPLACEMENT PARTS LIST

Notes:

1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. The unit of resistance is Ω (ohm). K=1000Ω , M=1000kΩ .
5. The unit of capacitance is μF (microfarad). P=10^{-6} μF.
6. Ⓚ-marked parts are used for black only, while ○-marked parts are for silver type only.
7. Part other than Ⓚ-and ○-marked are used for both black and silver type.
8. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
9. The parenthesized numbers in the column of description stand for the quantity per set.

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value
ERG	2	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value

Resistor Type	Wattage	Tolerance
ERD : Carbon	10 : 1/8W	J : ± 5%
ERG : Metal Oxide	25 : 1/4W	G : ± 2%
ERO : Metal Film	S1 : 1/2W	K : ±10%
	2 : 2W	
ERF : Non-flammable	3 : 3W	

ERD10TLJ□□□ → Chip type carbon.

Numbering System of Capacitor

Example

ECKD	1H	103	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Capacitor Type	Voltage		Tolerance
	ECEA Type	Others	
ECEA : Electrolytic	0J : 6.3V	1H : 50V DC	C : ±0.25pF
ECET : Electrolytic	1A : 10V	KC : 400V AC	K : ±10%
ECEA. . . N : Non Polar Electrolytic	1C : 16V	2H : 500V DC	Z : +80%, −20%
ECCD : Ceramic	1E : 25V		P : +100%, −0%
ECKD : Ceramic	1V : 35V		D : ±0.5pF
ECQM : Polyester	1H : 50V		J : ±5%
ECQE : Polyester	50 : 50V		
	2 : 100V		

●RESISTORS

Ref. No.	Part No.	Value
R21,22	ERD10TLJ223U	22K
R23,24	ERD10TLJ223U	22K
R25,26	ERD10TLJ333U	33K
R27,28	ERD10TLJ123U	12K
R29 Ⓢ	ERD25FJ472	4.7K
R30,31	ERD10TLJ103U	10K
R32 Ⓢ	ERD25FJ103	10K
R33	ERD10TLJ102U	1K
R34,35	ERD10TLJ104U	100K
R36	ERD10TLJ333U	33K
R37,38 Ⓢ	ERD25FJ822	8.2K
R39 Ⓢ	ERD25TJ394	390K
R40 Ⓢ	ERD25TJ223	22K
R41,42	ERD10TLJ223U	22K
R43	ERD10TLJ223U	22K
R44,45 Ⓢ	ERD25TJ223	22K
R46	ERD10TLJ392U	3.9K
R47 Ⓢ	ERD25FJ472	4.7K
R48	ERD10TLJ392U	3.9K
R49	ERD10TLJ153U	15K
R50	ERD10TLJ103U	10K
R101,102 Ⓢ	ERD25TJ473	47K
R103,104 Ⓢ	ERD25FJ221	220
R105,106 Ⓢ	ERD25FJ220	22
R107,108 Ⓢ	ERD25FJ332	3.3K
R109,110 Ⓢ	ERD25FJ332	3.3K
R111,112 Ⓢ	ERD25FJ101	100
R113,114 Ⓢ	ERD25FJ332	3.3K
R115,116 Ⓢ	ERD25FJ121	120
R117,118 Ⓢ	ERD25FJ8R2	8.2
R119,120	ERD25TKG6802	68K
R121,122	ERD25TKF5231	5.23K
R125,126 Ⓢ	ERD25FJ561	560
R127,128 Ⓢ	ERD25FJ121	120
R129,130 Ⓢ	ERD25TJ334	330K
R201,202 Ⓢ	ERD25TJ824	820K
R203,204 Ⓢ	ERD25TJ824	820K
R205,206 Ⓢ	ERD25TJ824	820K
R207,208 Ⓢ	ERD25FJ272	2.7K
R209,210 Ⓢ	ERD25TJ223	22K
R211,212 Ⓢ	ERD25FJ332	3.3K
R213,214 Ⓢ	ERD25TJ563	56K
R215,216 Ⓢ	ERD25TJ273	27K
R217,218 Ⓢ	ERD25TJ824	820K
R219,220 Ⓢ	ERD25TJ824	820K
R221,222 Ⓢ	ERD25FJ102	1K
R223,224 Ⓢ	ERD25TJ153	15K
R225,226 Ⓢ	ERD25FJ332	3.3K
R227,228 Ⓢ	ERD25TJ153	15K
R229,230 Ⓢ	ERD25FJ332	3.3K
R231,232 Ⓢ	ERD25TJ104	100K
R233,234 Ⓢ	ERD25TJ273	27K
R235,236 Ⓢ	ERD25TJ563	56K
R237,238 Ⓢ	ERD25TJ824	820K
R239,240 Ⓢ	ERD25TJ824	820K
R241,242 Ⓢ	ERD25TJ824	820K
R251,252 Ⓢ (EGA)only	ERD25FJ122	1.2K
R253,254 Ⓢ (EGA)only	ERD25FJ122	1.2K
R255,256 Ⓢ (EGA)only	ERD25FJ222	2.2K
R257,258 Ⓢ (EGA)only	ERD25FJ222	2.2K
R259,260 Ⓢ (EGA)only	ERD25FJ222	2.2K
R261,262 Ⓢ (EGA)only	ERD25FJ222	2.2K
R263,264 Ⓢ (EGA)only	ERD25FJ222	2.2K
R265,266 Ⓢ (EGA)only	ERD25FJ222	2.2K
R301,302 Ⓢ	ERD25FJ221	220
R303,304 Ⓢ	ERD25TJ224	220K
R305,306 Ⓢ	ERD25FJ562	5.6K
R307,308 Ⓢ	ERD25FJ562	5.6K
R309,310 Ⓢ	ERD25FJ562	5.6K
R311,312 Ⓢ	ERD25TJ273	27K
R313,314 Ⓢ	ERD25FJ103	10K
R315,316 Ⓢ	ERD25FJ121	120
R317,318 Ⓢ	ERD25TJ183	18K
R319,320 Ⓢ	ERD25FJ103	10K
R321,322 Ⓢ	ERD25FJ102	1K
R323,324 Ⓢ	ERD25FJ222	2.2K
R325,326 Ⓢ	ERD25FJ270	27
R327,328 Ⓢ	ERD25FJ270	27
R329,330 Ⓢ	ERD25FJ102	1K
R331,332 Ⓢ	ERD25FJ102	1K
R333,334 Ⓢ	ERD25FJ102	1K
R335,336 Ⓢ	ERD25FJ102	1K
R341,342 ⚠	ERDS1FJ101	100
R343,344 ⚠	ERDS1FJ101	100
R345,346	ERD2FCJ6R8	6.8
R347,348	ERD2FCG101	100
R349,350 Ⓢ⚠	ERD25FJ102	1K
R351,352 Ⓢ	ERD25FJ561	560
R355,356 Ⓢ	ERD25TJ104	100K
R357,358 Ⓢ	ERD25TJ104	100K
R359,360 Ⓢ	ERD25TJ223	22K
R361,362 Ⓢ	ERD25TJ823	82K
R363,364 Ⓢ⚠	ERD25FJ331	330
R365,366 Ⓢ⚠	ERD25FJ2R2	2.2
R367,368 Ⓢ⚠	ERD25FJ2R2	2.2
R369,370 Ⓢ⚠	ERD25FJ2R2	2.2
R371,372 Ⓢ⚠	ERD25FJ2R2	2.2
R373,374	ERF3RKR33	0.33
R375,376	ERF3RKR33	0.33
R377,378	ERF3RKR33	0.33
R379,380	ERF3RKR33	0.33
R381,382 Ⓢ	ERD25TJ474	470K
R383,384 Ⓢ	ERD25TJ474	470K
R385,386	ERD2FCJ2R2	2.2
R387,388	ERD2FCJ2R2	2.2
R391,392 Ⓢ	ERG2ANJ100	10
R393,394 Ⓢ⚠	ERD25FJ100	10
R395,396 Ⓢ⚠	ERD25FJ561	560
R397,398 Ⓢ⚠	ERD25FJ182	1.8K
R401,402 Ⓢ⚠	ERD25FJ2R2	2.2
R403,404 Ⓢ⚠	ERD25FJ2R2	2.2
R501,502 Ⓢ⚠	ERD25FJ222	2.2K
R503,504 Ⓢ⚠	ERD25FJ681	680
R505,506 Ⓢ⚠	ERD25FJ331	330
R509 Ⓢ	ERD25TJ223	22K
R510 Ⓢ	ERG3ANJ102	1K
R511 Ⓢ	ERD25TJ153	15K
R512 Ⓢ	ERD25TJ104	100K
R601 Ⓢ	ERD25FJ821	820
R602 Ⓢ	ERD25FJ391	390
R603 Ⓢ	ERD25FJ821	820
R604 Ⓢ	ERD25FJ681	680
R605,606 Ⓢ	ERD25FJ821	820
R607,608 Ⓢ	ERD25FJ391	390
R609 Ⓢ	ERD25FJ391	390
R610,611 Ⓢ	ERD25FJ821	820
R612 Ⓢ	ERD25FJ821	820
R613 Ⓢ⚠	ERD25FJ470	47
R701,702 Ⓢ	ERG3ANJ561	560
R705 Ⓢ	ERD25FJ101	100
R706 Ⓢ	ERD25TJ153	15K
R707 Ⓢ	ERD25FJ681	680
R708 Ⓢ	ERD25TJ153	15K
R709,710 Ⓢ	ERD2FCJ6R8	6.8
R711,712 Ⓢ	ERG2ANJ222	2.2K
R801,802 Ⓢ	ERD25TJ273	27K
R803,804 Ⓢ	ERD25TJ333	33K
R805,806 Ⓢ	ERD25TJ333	33K
R901,902	ERD2FCG100	10
R903,904 Ⓢ	ERG2ANJ331	330

●CAPACITORS

Ref. No.	Part No.	Value
C1 ⚠	ECKDKC103PF	0.01
C2(EGA)only ⚠	ECKDKC103PF	0.01
C4,5 ⚠ (EGA)only	ECKDKC222MF	0.0022
C6,7 ⚠ (EGA)only	ECKDKC222MF	0.0022
C21,22	ECEA1EU3R3	3.3
C23	ECEA1CU100	10
C24	ECEA1CU101	100
C25	ECEA1HUR47	0.47
C26 Ⓢ	ECCD1H121K	120P
C27	ECEAOJU101	100
C28 Ⓢ	ECKD1H223ZF	0.022
C101,102 Ⓢ	ECKD1H103ZF	0.01
C103,104 Ⓢ	ECCD1H820K	82P
C105,106 Ⓢ	ECKD1H222KB	0.0022
C107,108	ECEAOJU222	2200
C109,110	ECQM1H473JV	0.047
C111,112	ECQM1H103JV	0.01
C113,114	ECQM1H332JV	0.0033
C115,116 ⚠	ECEA1EN4R7S	4.7
C117,118	ECQM1H103JV	0.01
C121,122	ECEA1VU470	47
C201,202	ECQM1H563KV	0.056
C203,204	ECQM1H273KV	0.027
C205,206	ECQM1H103KV	0.01
C207,208	ECQM1H183KV	0.018
C209,210	ECQM1H823KV	0.082
C211,212	ECEA1EU4R7	4.7
C213,214	ECQM1H103KV	0.01
C215,216	ECQM1H183KV	0.018
C217,218	ECQM1H823KV	0.082
C219	ECEAOJU101	100
C233,234 Ⓢ (EGA)only	ECKD1H331KB	330P
C235,236 Ⓢ (EGA)only	ECKD1H331KB	330P
C237,238 Ⓢ (EGA)only	ECKD1H331KB	330P
C239,240 Ⓢ (EGA)only	ECKD1H331KB	330P
C303,304 Ⓢ	ECKD1H331KB	330P
C307,308 Ⓢ	ECCD2H070D	7P
C309,310 Ⓢ	ECCD2H070D	7P
C311,312 Ⓢ	ECCD2H560K	56P
C313,314 Ⓢ	ECCD2H560K	56P
C315,316	ECEA1HU330	33
C317,318	ECEA2AU4R7	4.7
C319,320	ECEA2AU010	1
C321,322	ECEA1CU100	10
C323,324	ECEA1CU100	10
C325,326 ⚠	ECEA1EN4R7S	4.7
C327,328 Ⓢ	ECCD1H040CC	4P
C331,332 Ⓢ	ECKD1H681KB	680P
C333,334 Ⓢ	ECKD1H681KB	680P
C335,336 Ⓢ	ECCD1H820K	82P
C337,338 Ⓢ	ECCD1H820K	82P
C339,340	ECQM1H473KV	0.047
C341,342	ECQM1H473KV	0.047
C351,352 (EGA)only	ECQM1H222KV	0.0022
C353 Ⓢ (EGA)only	ECCD1H150K	15P
C354(EGA)only	ECQM1H222KV	0.0022
C355,356 (EGA)only	ECQM1H103KV	0.01
C357,358 (EGA)only	ECQM1H103KV	0.01
C401,402	ECET1KV822Z	8200
C403,404	ECET1KV822Z	8200
C405	ECEA2AU220	22
C501	ECEA1EU3R3	3.3
C601	ECEA1CG102	1000
C602 Ⓢ	ECKD1H103ZF	0.01
C703,704	ECEA1JS100	10
C707	ECEA1HU100	10
C708	ECEA1HG100S	10
C709	ECEA1EU100	10
C710(EGA)only	ECQE2104KS	0.1
C801,802	ECQD1H220K	22P

Ref. No.	Part No.	Part Name & Description
INTEGRATED CIRCUITS		
IC21	MN1404STE	ICQ Control
IC101,301	SVINJM4560DX	Equalizer, DC Servo
TRANSISTORS		
Q21～29 305～308,313 314,337,338 705	2SC1815−Y	Switching, Cascade, Current Stabilizer Bias Control, Regulator
Q101～104	2SK369−GR	FET Equalizer
Q301～304	2SK117−GR	FET Differential Amp.
Q309～312 501～504	2SC1845−E	Differential Amp., Overload Detector, Switching
Q315,316,323, 324	2SA1370−D	Current Mirror, Drive
Q317,318	2SA1370−D	Pre Drive
Q319,320	2SC3467−D	Pre Drive
Q321,322	2SC3467−D	Drive
Q325,326	2SC3298A−Y	Drive
Q327,328	2SA1306A−Y	Drive
Q329～332	2SC3280−R	Power Amp.
Q333～336	2SA1301−R	Power Amp.
Q701	2SC2592−R	Regulator
Q702	2SA1112−R	Regulator
Q703,704	2SK34−D1	FET Regulator
DIODES		
D21,22 Ⓢ	MA162A	
D23	MA1062M	Zener, 6.2V
D101,102 301～306 Ⓢ	MA162A	
D307～310	MA182	
D311～318	OA90A−R	Synchronous Bias
D319～322	MA27W−A	
D323,324,623, 625,626	MA1030	Zener, 3V
D401～408 Ⓢ⚠	SVDS3V40	Rectifier
D501～505 Ⓢ	MA162A	
D506	SVDMZ422B	Zener, 22V
D601 Ⓢ⚠	SVDSR1K2	Rectifier
D605,608	LN446YP	L. E. D.(Safety Operation, Via Tone)
D606	LN346GP	L. E. D.(Auto)
D607	LN846RP	L. E. D.(Straight DC)
D609～613,615 619,621,622	SVDPR5533K	L. E. D.(Input, MM, Speaker)
D614,616,617, 620	SVDAY5533K−M	L. E. D.(Tape, MC)
D618 (PA,PE)only	LN0603GP3G	L. E. D.(Computer Drive)
D618 Other areas	LN0603YP4MS	L. E. D.(Computer Drive)
D624	MA1030	Zener, 3V

Ref. No.	Part No.	Part Name & Description
COILS		
L1,2(EGA)only L301,302 L305～308 (EGA)only	ELQ050D15 SLQY15G−30 SLQY07G−30	Choke Choke Choke
TRANSFORMERS		
T1(EGA)only ⚠	SLT5R59	Power Source
T1 Other areas ⚠	SLT5R57	Power Source
VARIABLE RESISTORS		
VR201	EWJKMA054B15	Volume, 100kΩ(B)
VR202	EWHFKA002G15	Balance, 100kΩ(G)
VR203	EWCX8A011012	Treble
VR204	EWCXEA011C15	Bass, 100kΩ(C)
VR301,302	EVNK6AA00B13	ICQ Adj. 1 kΩ(B)
THERMAL DETECTOR		
PS301	SRPBG47101	60°C(140°F)
THERMISTER		
TH301,302	ERTD2ZHL103S	10kΩ
RELAY		
RLY501	SSY124	Speaker
COMPONENT COMBINATIONS		
Z401	SXRFS203ZSM	0.01(×2)
FUSE		
F1(EGA)only ⚠	XBA2C31TRO	250V, T3.1A
F1 Other areas ⚠	XBA2C63TRO	250V, T6.3A
F2(EGA)except ⚠	XBA2C31TRO	250V, T3.1A
SWITCHES		
S1,6,7	SSH3067	Phono Selector, Loudness, Subsonic Filter
S2,3	SSH807	Input Selector, Tape Selector
S4	SSR189	Rec Selector
S5	SSH1143	Muting
S8	SSH1141	Operation
S9,10	SSH2077	Speaker
S11	SSH1152	Inpedance
S13,14	SSH473	Turnover
S12 (EGA)only ⚠	ESB90227S	Power Source
S12 ⚠ Other areas	ESB90259S	Power Source
S13 ⚠ (EGA)except	ESE37200	Voltage Selector

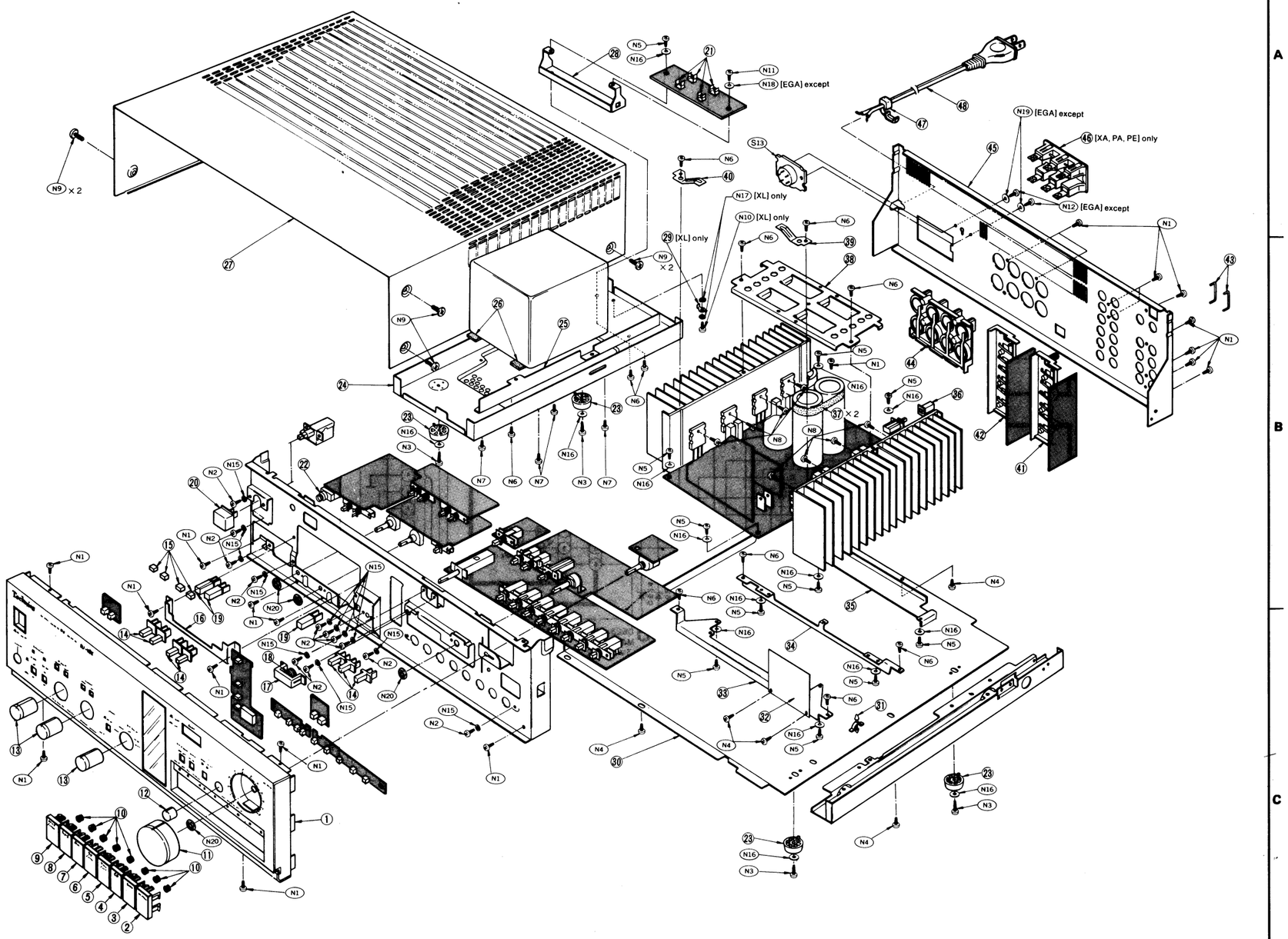
Ref. No.	Part No.	Part Name & Description
CABINET and CHASSIS PARTS		
1 ○	SGWUV8X−SE	Front Panel, Ass'y (Silver Type) (1)
1(PA,PE)only ○	SGWUV8X−SP	Front Panel, Ass'y (Silver Type) (1)
1 Ⓚ	SGWUV8X−KE	Front Panel, Ass'y (Black Type) (1)
2 ○	SBC641−2A	Button, Phono (Silver Type) (1)
2 Ⓚ	SBC641−4A	Button, Phono (Black Type) (1)
3 ○	SBC641−2B	Button, Tuner (Silver Type) (1)
3 Ⓚ	SBC641−4B	Button, Tuner (Black Type) (1)
4 ○	SBC641−2C	Button, CD(Silver Type) (1)
4 Ⓚ	SBC641−4C	Button, CD(Black Type) (1)
5 ○	SBC641−2D	Button, Video/ Aux 2 (Silver Type) (1)
5 Ⓚ	SBC641−4D	Button, Video/ Aux 2 (Black Type) (1)
6 ○	SBC641−2E	Button, TV/Aux 1 (Silver Type) (1)
6 Ⓚ	SBC641−4E	Button, TV/Aux 1 (Black Type) (1)
7 ○	SBC641−2F	Button, Source (Silver Type) (1)
7 Ⓚ	SBC641−4F	Button, Source (Black Type) (1)
8 ○	SBC641−2G	Button, Tape 2 (Silver Type) (1)
8 Ⓚ	SBC641−4G	Button, Tape 2 (Black Type) (1)
9 ○	SBC641−2H	Button, Tape 1 / DA Tape(Silver Type) (1)
9 Ⓚ	SBC641−4H	Button, Tape 1 / DA Tape(Black Type) (1)
10	SUS753−1	Spring, Button (8)
11	SBN1177	Knob, Volume (1)
12	SBN1181	Knob, Balance (1)
13	SBN993−1	Knob, Tone, Rec (3)
14	SBC621	Button (7)
15	SHG6207	Rubber (4)
16	SMN1897	Bracket (1)

Ref. No.
CABINET a
17
17
18
19
20
21(EGA)only
21 Other area
22
23
24
25
26
27(EK)only
27 Other area
27(EK)only
27 Other area
28
29(XL)only
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45(EK)only
45(EGA)only
45(XL)only
45(XA,PA,PE
45 Other area
46(XA,PA,PE only
47(EK)
47(XL)
47 Other area
48(EW,XA)
48(EK)
48(XL)
48(PA,PE)
48 Other area
49
SCREWS
N1
N2
N3
N4
N5
N6
N7

Ref. No.	Part No.	Part Name & Description
CABINET and CHASSIS PARTS		
17 ○	SBC643	Button, Muting (Silver Type) (1)
17 Ⓚ	SBC643−2	Button, Muting (Black Type) (1)
18	SUS123−3	Spring, Button (1)
19	SBC399T	Button, Speaker, Operation (3)
20	SBC627	Button, Power (1)
21(EGA)only	SJT347	Holder, Fuse (2)
21 Other areas	SJT347	Holder, Fuse (4)
22	SJJ71B	Jack, Headphone(1)
23	SKL249	Foot (4)
24	SML107−8	Bracket, Power Transformer (1)
25	SUW2163−1	Bracket (1)
26	SHG6355	Rubber, Power Transformer (2)
27(EK)only ○	SKCUV8X−SK	Cabinet(Silver Type) (1)
27 Other areas ○	SKC1590S2	Cabinet(Silver Type) (1)
27(EK)only Ⓚ	SKCUV8X−KK	Cabinet(Black Type) (1)
27 Other areas Ⓚ	SKC1590BB2	Cabinet(Black Type) (1)
28	SUW2828	Bracket, P. C. B.(1)
29(XL)only	RJT202B	Terminal (1)
30	SKU8990−4	Bottom Board (1)
31	SHR9720	Holder, P. C. B. (1)
32	SMC1137	(1)
33	SUW2159	Bracket (1)
34	SUW2165	Bracket (1)
35	SUW2161	Bracket (1)
36	SBC527	Button, Speaker Impedance (1)
37	SHS2445	Spacer (2)
38	SMN1895−1	Bracket, Electrolytic Capacitor (1)
39	SUW2153−2	Bracket (1)
40	SUW2153−3	Bracket (1)
41	SJF3059−8N	Terminal Board (1)
42	SJF3059−2N	Terminal Board (1)
43	SJP9205−2	Pin (2)
44	SJF4815−1	Terminal, Speaker (1)
45(EK)only	SGPUV8X−SK	Rear Panel, Ass'y (1)
45(EGA)only	SGPUV8X−SG	Rear Panel, Ass'y (1)
45(XL)only	SGPUV8X−SL	Rear Panel, Ass'y (1)
45(XA,PA,PE)	SGPUV8X−SX	Rear Panel, Ass'y (1)
45 Other areas	SGPUV8X−SE	Rear Panel, Ass'y (1)
46(XA,PA,PE) only ⚠	SJS601−3	Socket, AC Outlet (1)
47(EK)	SHR129	Bushing, AC Cord (1)
47(XL)	SHR131	Bushing, AC Cord (1)
47 Other areas	SHR127	Bushing, AC Cord (1)
48(EW,XA) ⚠	SJA111	AC Cord (1)
48(EK) ⚠	QFC1205M	AC Cord (1)
48(XL) ⚠	QFC1207MA	AC Cord (1)
48(PA,PE) ⚠	RJA52Z	AC Cord (1)
48 Other areas ⚠	SJA97	AC Cord (1)
49	SHR301	Clamper (10)
SCREWS		
N1	XTBS3+8BFZ1	Tapping, with Detent, ⊕3×8 (20)
N2 Ⓢ	XSN3+6S	⊕3×6 (12)
N3 Ⓢ	XTN3+10B	Tapping, ⊕3×10(4)
N4	XTBS3+8BFYR1	Tapping with Detent, ⊕3×8 (5)
N5 Ⓢ	XTN3+8B	Tapping, ⊕3×8 (11)
N6 Ⓢ	XTB3+8BFZ	Tapping, ⊕3×8 (11)
N7	XTB4+8F	Tapping, ⊕4×8 (4)

Ref. No.	Part No.	Part Name & Description
SCREWS		
N8	XTW3+12J	Tapping, ⊕3×12(8)
N9 ○	SNE2095−4	Tapping(Silver Type) (6)
N9 Ⓚ	SNE2095−5	Tapping(Black Type) (6)
N10(XL)only Ⓢ	XTN3+8B	Tapping, ⊕3×8 (1)
N11(EGA)only	XTBS3+8BFZ1	Tapping with Detent, ⊕3×8 (1)
N11 Ⓢ Other areas	XTN3+8B	Tapping, ⊕3×8 (1)
N12 Ⓢ (EGA)except	XSN3+6S	⊕3×6 (2)
WASHERS		
N15 Ⓢ	XWA3B	Spring, ϕ3 (12)
N16 Ⓢ	XWG3	Plain, ϕ3 (15)
N17(XL)only Ⓢ	XWC3B	External Toothed Lock, ϕ3 (2)
N18 Ⓢ (EGA)except	XWG3	Plain, ϕ3 (1)
N19 Ⓢ (EGA)except	XWA3B	Spring, ϕ3 (2)
NUT		
N20	SNE4021	(4)
ACCESSORIES		
A1(XA)only ⚠	SJP5213−1	Plug (1)
A2(XA)only ⚠	SJP5215	Plug (1)
A3(PA,PE)only ⚠	SJP9215	Plug (1)
A4(EGA)only	SQF12057	Instruction Book (1)
A4(XA)only	SQF12058	Instruction Book (1)
A4(PA,PE)only	SQF12059	Instruction Book (1)
A4 Other areas	SQF12056	Instruction Book (1)
PACKING PARTS		
P1	SPP730	Polyethylene Bag (1)
P2(EH,EK,XA,PA,PE)	SPS4289−1	Pad, Left Side (1)
P2 Other areas	SPS4289−6	Pad, Left Side (1)
P3(EH,EK,XA,PA,PE)	SPS4291−2	Pad, Right Side (1)
P3 Other areas	SPS4291−6	Pad, Right Side (1)
P4(EF)only	SPG4822	Carton Box (1)
P4 (EW,XA,PA,PE)	SPG4823	Carton Box (1)
P4 Other areas	SPG4821	Carton Box (1)
P4(EK)only ○	SPG4838	Carton Box(Silver Type) (1)
P4(EK)only Ⓚ	SPG4838−1	Carton Box(Black Type) (1)
P5 ○	SGK1411	Label(Silver Type only) (2)

■ EXPLODED VIEW



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